

REMARKS

Claims 16-29 are pending in the application.

Applicant herein amends the specification to correct errors that occurred in converting conductivity data from units of $\text{Ohm}^{-1} \text{ meter}^{-1}$ to units of $\text{microOhm}^{-1} \text{ centimeter}^{-1}$, as used in the present specification. Applicant asserts that, pursuant to MPEP 2163.07, the amendment is not new matter since it merely corrects an obvious error. Those of ordinary skill would recognize the existence of the error as well as the appropriate correction. For example, page 12, lines 16-18 of the present specification states that semiconductive material has a conductivity of about 10^4 to about 10^{12} $\text{microOhm}^{-1} \text{ centimeter}^{-1}$, but those of ordinary skill readily recognize that the stated range sets forth too high of conductivity for semiconductive material.

Page 523 of "Introduction to Materials Science for Engineers," a copy of which is attached hereto, states that semiconductive material has a conductivity in the range of 10^{-4} to $10^4 \text{ Ohm}^{-1} \text{ meter}^{-1}$ (10^{-12} to $10^{-4} \text{ microOhm}^{-1} \text{ centimeter}^{-1}$). It is readily apparent that the incorrect range of conductivity set forth in the present specification may be obtained by applying a conversion factor of 10^8 to the range set forth on page 523 of the reference. Also, it is apparent to those of ordinary skill that a conversion factor of 10^{-8} should instead be applied to the range set forth on page 523 of the reference to convert units of $\text{Ohm}^{-1} \text{ meter}^{-1}$ to $\text{microOhm}^{-1} \text{ centimeter}^{-1}$. Respective amendments are made to the values described on page 12, lines 13-16. At least for such reasons, Applicant asserts that the amendments do not constitute new matter.

Claims 16-18 stand rejected under 35 U.S.C. 102(e) as being anticipated by Al-Shareef. Claims 19-21 and 23 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Al-Shareef in view of Rhodes. Applicant requests reconsideration.

Applicant notes that the present application makes a priority claim to August 31, 2000 and that Al-Shareef and the present application have a common assignee. Pursuant to 35 U.S.C. 103(c), Applicant asserts that Al-Shareef qualifies as prior art only under 35 U.S.C. 102(e) and that the subject matter of the present application and Al-Shareef were owned by the same person at the time the inventions were made. At least for such reason, Al-Shareef cannot preclude patentability of the pending claims. Applicant requests allowance of claims 16-21 and 23 in the next Office Action.

Claims 22 and 24-29 stand rejected under 35 U.S.C. 102(b) as being anticipated by Fukuzumi. Applicant requests reconsideration.

Applicant previously asserted in the Response to May 23, 2003 Office Action that Fukuzumi does not anticipate claims 22 and 24-29. Even so, the present Office Action does not contain any response to Applicant's assertions. The previous rejections are merely restated with minor changes as to their form. The substance of the Office's rejections is identical to those prior. The Office Action states on page 7 that Applicant's prior assertions are moot in view of the new grounds of rejection, but no new grounds of rejection are alleged by the Office regarding claims 22 and 24-29. Applicant notes the Office's failure to advance prosecution of the application by this action and the unnecessary burden that it places on Applicant. Applicant respectfully requests that the Office refrain from such lapses in Office Action completeness.

Claim 22 sets forth a capacitor construction that includes, among other features, an opening in an insulative layer over a substrate, a hemispherical grain polysilicon layer over the sides of the opening but not over the bottom, a conformal first capacitor electrode on the polysilicon, a capacitor dielectric layer on the first electrode, and a second capacitor electrode over the dielectric layer. The first electrode is sufficiently thin that the first electrode has a rugged outer surface with an outer surface area per unit area greater than an outer surface area per unit area of the substrate underlying the first electrode. Page 5-6 of the Office Action allege that Fukuzumi discloses each and every element of claim 22. However, Applicant asserts that Fukuzumi fails to disclose any single capacitor construction that includes each of the claim limitations.

Pages 5-6 of the Office Action allege that various figures of Fukuzumi disclose every limitation set forth in claim 22. Some confusion exists on pages 5-6 since some of the reference numerals listed by the Office do not match with the figures listed by the Office. Nevertheless, review of the entirety of Fukuzumi does not reveal any single figure or any description showing a capacitor construction that discloses every limitation of claim 22. It is entirely irrelevant that the Office alleges that certain figures, such as Figs. 20-22, disclose an opening in an insulative layer, a hemispherical grain polysilicon layer over the sides of the opening but not over the bottom, and a first capacitor electrode. None of such figures additionally disclose a capacitor dielectric layer and a second capacitor electrode, as set forth in claim 22.

Similarly, it is also entirely irrelevant that the Office alleges Fig. 24 to disclose a first capacitor electrode, a capacitor dielectric layer, and a second capacitor electrode. Such figure fails to disclose an opening in an insulative layer and a hemispherical grain

polysilicon layer over the sides of the opening but not over the bottom, as set forth in claim 22.

Also, it is entirely irrelevant that the Office alleges Fig. 13 to disclose an opening in an insulative layer, a hemispherical grain polysilicon layer over the sides of the opening, a first capacitor electrode, a capacitor dielectric layer, and a second capacitor electrode. Such figure fails to disclose that the hemispherical grain polysilicon layer is not over the bottom of the opening in the insulative layer, as set forth in claim 22.

A finding of anticipation requires that Fukuzumi disclose a capacitor construction containing each and every element set forth in claim 22. Anticipation does not occur if Fukuzumi discloses one capacitor construction disclosing some limitations and another capacitor construction disclosing other limitations. Fukuzumi must disclose a single capacitor construction that includes all of the limitations set forth in claim 22. Applicant asserts that Fukuzumi does not disclose any such capacitor construction.

Applicant further asserts that Fukuzumi does not contain any suggestion that would motivate a person of ordinary skill to modify a Fukuzumi capacitor construction so as to obtain the capacitor construction set forth in claim 22. No suggestion exists in Fukuzumi to combine features of different capacitor constructions shown in such reference. In many cases, such modifications would render the Fukuzumi devices inoperable for their intended purpose. At least for such reasons, Fukuzumi does not anticipate claim 22 and such claim is also patentable over Fukuzumi. Claims 24-26 depend from claim 22 and are not anticipated at least for such reason as well as for the additional limitations of such claims not disclosed or suggested.

Claim 27 sets forth a capacitor construction that includes, among other features, a surface area enhancement layer containing undoped polysilicon over a substrate, a first capacitor electrode on and in direct contact with the enhancement layer, a capacitor dielectric layer over the first electrode, and a second capacitor electrode over the dielectric layer. The enhancement layer has an outer surface area per unit area that is greater than an inner surface area per unit area of the enhancement layer. The first capacitor electrode does not contain the enhancement layer as part of the first electrode. Also, the first electrode has an inner surface area per unit area and an outer surface area per unit area that are both greater than the inner surface area per unit area of the enhancement layer. Page 6 of the Office Action alleges that Fukuzumi discloses every limitation of claim 27. However, Applicant asserts that Fukuzumi fails to disclose an enhancement layer containing undoped rugged polysilicon. Fukuzumi also fails to disclose a first capacitor electrode that does not include the enhancement layer as part of the first electrode.

Page 6 of the Office Action alleges that polysilicon film 51 of Fukuzumi discloses the claimed enhancement layer containing undoped rugged polysilicon. The Office Action also alleges that metal film 52 discloses the claimed first capacitor electrode that does not include the enhancement layer as part of the first electrode. However, by making such allegations, the Office asserts an interpretation of the capacitor construction in Fukuzumi that renders such construction inoperable for its intended purpose. Column 14, lines 62-65 expressly state that polysilicon film 51 "forms part of the lower electrode of a capacitor." At least for reason, Fukuzumi fails to disclose the

claimed first capacitor electrode that does not include the enhancement layer as part of the first electrode.

In addition, those of ordinary skill readily recognize that polysilicon film 51 must form part of the lower electrode. Since metal film 52 does not directly contact the contact plug 3 that connects the element region of the underlying semiconductor substrate to the capacitor, polysilicon film 51 must provide the conductive connection between metal film 51 and contact plug 3. In this manner, the lower electrode formed by metal film 52 is connected to the element region of the semiconductor substrate and may function as intended. If, instead, polysilicon film 51 is undoped or otherwise does not form a part of the lower electrode in Fukuzumi, then the resulting capacitor cannot function properly.

Page 6 of the Office Action alleges that Fukuzumi discloses polysilicon film 51 being undoped. However, no express disclosure of such a feature exists within Fukuzumi. Instead, the Office appears merely to assume that polysilicon film 51 is undoped. However, as indicated, polysilicon film must be doped sufficiently to form a conductive connection between contact plug 3 and metal film 52. At least for such reason, Fukuzumi cannot be considered to disclose the claimed enhancement layer containing undoped rugged polysilicon.

At least for the reasons indicated, Fukuzumi fails to disclose the enhancement layer set forth in claim 27. Fukuzumi also fails to disclose the claimed first capacitor electrode that does not comprise the enhancement layer as part of the first electrode. Fukuzumi thus does not anticipate claim 27.

Claim 28 sets forth a capacitor construction that includes, among other features, an opening having sides and a bottom in an insulative layer, a HSG polysilicon layer over the sides of the opening but not over the bottom, a conformal first capacitor electrode on the HSG polysilicon layer, a capacitor dielectric layer on the first electrode, and a second capacitor electrode over the dielectric layer. The first capacitor electrode does not include the HSG polysilicon layer as part of the first electrode. Also, the first electrode is sufficiently thin that the first electrode has a rugged outer surface with an outer surface area per unit area greater than a surface area per unit area of the sides of the opening over which the HSG polysilicon layer is formed. Pages 6-7 of the Office Action allege that Fukuzumi discloses every limitation of claim 28. However, Applicant asserts that Fukuzumi fails to disclose any single capacitor construction that includes all of the limitations set forth in claim 28.

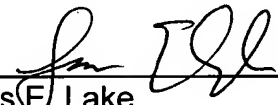
As may be appreciated from the above discussion regarding the deficiencies of Fukuzumi as applied to claim 22, Fig. 20-22 relied upon by the Office fail to disclose the claimed capacitor dielectric layer and second capacitor electrode. No capacitor electrodes or dielectric layers are disclosed in any of Figs. 20-22 or the text associated therewith. Similarly, Fig. 24 of Fukuzumi fails to disclose the claimed opening in an insulative layer, HSG polysilicon layer, and conformal first capacitor electrode on the HSG polysilicon layer that does not include the HSG polysilicon layer as part of the first electrode. Anticipation of claim 28 requires that Fukuzumi disclose a capacitor construction including each and every limitation set forth in claim 28. Since it is well established that Fukuzumi fails in this regard, Fukuzumi does not anticipate claim 28.

Claim 29 depends from claim 28 and is not anticipated at least for such reason as well as for the additional limitations of such claim not disclosed. Fukuzumi does not anticipate claims 22 and 24-29 and Applicant requests allowance of such claims in the next Office Action.

Applicant herein establishes adequate reasons supporting patentability of claims 16-29 and requests allowance of all such pending claims in the next Office Action.

Respectfully submitted,

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